Frequently Asked Questions

ESG Back-Testing: Backward Data Assumption Overview

1. **What does "Backward Data Assumption" mean with respect to ESG data?** Typically, when S&P DJI creates back-tested index data, we use data from relevant databases, or actual live data. Examples include constituent-level data such as historical price, market capitalization, and corporate action data. As ESG investing is still in the early stages of development, certain data points used to calculate S&P DJI's ESG indices may not be available for the entire desired period of back-tested history. In such cases, S&P DJI may employ a process called "Backward Data Assumption (or pulling back) of ESG data for the calculation of back-tested historical performance.

   Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index universe. For example, if an index methodology requires all eligible constituents to have product involvement data, and actual product involvement data is only available for a company from 2015 forward, then S&P DJI will use the 2015 product involvement data for that company for the purposes of calculating back-tested data for the years 2010 through 2014.

2. **Why is "Backward Data Assumption" for ESG data sometimes necessary?** Employing the Backward Data Assumption technique generally provides a more indicative depiction of index characteristics and risk/return profile than would be provided by limiting back-tests to actual live data. The Backward Data Assumption also allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual live data.

   Many ESG data providers started with limited coverage and have been increasing their historical coverage over the past few years, so creating back-tests that use only actual historical live data would often lead to unrepresentative index constituent characteristics. Without Backward Data Assumption of ESG data, far fewer companies would be eligible for or selected from the index universe in the back test compared with the same index's more recent and on-going index universe of eligible and selected constituents.

   Therefore, S&P DJI may employ a Backward Data Assumption methodology to provide a longer and more representative back-test period.

3. **Are any live index rebalances affected by the practices of Backward Data Assumption?** Actual live data is used in the rebalance calculation of an index immediately prior to launch and in all rebalances after the launch of the index. Backward Data Assumption may only affect the historical back-test prior to then.

4. **Which indices have back-tested history that uses Backward Data Assumption?** S&P DJI uses Backward Assumption Data with respect to Sustainalytics and Arabesque data, and sometimes uses it with respect to data from Trucost and SAM, both part of S&P Global.

Therefore, back-tested history for indices that use data from any of those sources may be affected by the Backward Data Assumption method.

The methodology and factsheets of any index that uses Backward Assumption Data in back-tested history will explicitly state so. The methodology will include a table setting forth the specific data points and relevant time period for which Backward Data Assumption was used.

5. **When do indices typically have back-tested history that uses Backward Data Assumption of ESG data?** For indices launched from 2020 onward, Backward Data Assumption is used in all indices that use exclusionary screens based on Sustainalytics' product involvement data and Arabesque's United Nations Global Compact (UNGC) data.

   For indices launched prior to 2020, Backward Data Assumption of ESG exclusionary screen data was limited only to Sustainalytics and Arabesque data for historical rebalances prior to 2013.

   S&P DJI may also employ Backward Data Assumption to S&P DJI's ESG Scores and/or Trucost datapoints, if based on historical coverage it is determined that attaining the index objective would be severely restricted otherwise. Historical coverage is assessed year-by-year, both in terms of the number of constituents and weight of those constituents in the underlying universe.

6. **What are the disadvantages of Backward Data Assumption?** The primary disadvantage of Backward Data Assumption technique is its potential to introduce survivorship-bias into the index performance. Surviving companies have data that can be pulled back, whereas the non-surviving companies may not; therefore, surviving companies are more likely to be included in the index historically, which might provide better results than if the ESG factors were applied to actual live data. Moreover, aside from survivorship bias, as a general matter, it is possible that the historical application of the ESG methodology against live data may have produced a different index composition with lower performance than that generated by using Backward Data Assumption.

   Backward Data Assumption is never employed for the purpose of improving the performance of the historical index back-tests.

7. **What are the disadvantages of *not* using Backward Data Assumption?** S&P DJI generally employs the Backward Data Assumption technique to provide a more indicative depiction of index characteristics and risk/return profile than would be provided by limiting back-tests to actual live data. The Backward Data Assumption also allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual live data.

   By not employing this technique the back-test would fail to provide a reasonable representation of how the strategy described in the index methodology may have performed with more recent coverage levels.

8. **What are the underlying assumptions when employing Backward Data Assumption?** Backward Data Assumption when applied to data used in exclusionary screens such as Sustainanalytics or Arabesque data, inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved

historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too.

When the Backward Data Assumption is applied to unique datapoints such as ESG scores of a company, it has the effect of applying current societal standards to its historical record, even if the historical ESG score may have been different due to different societal standards at that point in time. However, as discussed previously, for non-exclusionary data, this is applied only in those limited circumstances when, based on historical coverage, it is determined that attaining the index objective would be severely restricted otherwise.

PERFORMANCE DISCLOSURE/BACK-TESTED DATA:

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the index is set to a fixed value for calculation purposes. The Launch Date designates the date when the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its data feed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Information presented prior to an index's launch date is hypothetical back-tested performance, not actual performance, and is based on the index methodology in effect on the launch date applied retroactively. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate S&P DJI's ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using "Backward Data Assumption" (or pulling back) of ESG data for the calculation of back-tested historical performance. "Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior history of index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used.

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